ABSTRACT

Recombinant proteins derived from hepatocyte growth factor (HGF) and macrophage stimulating protein (MSP) comprising two super domains separated by a spacer sequence are disclosed. The recombinant proteins are obtained by combining the hairpin loop (HL) and kringle (K1-K4) domains of HGF and/or MSP α chains, according to general formula (I):

$$[A] - B - [C] - (D)y \qquad (I)$$

in which [A] corresponds to the sequence $(LS)_m$-HL-K1-$(K2)_n$-$(K3)_o$-$(K4)_p$, B is the sequence $[(X)_q\ Y]_r$, [C] corresponds to the sequence HL-K1-$(K2)_s$-$(K3)_t$-$(K4)_u$, D is the sequence W-Z, and y is 0 or 1. The recombinant proteins are useful for preventing or treating the toxic side effects of chemotherapy, and reducing cell damage induced by other types of drugs.